Complete Summary

GUIDELINE TITLE

Care of the patient with open angle glaucoma. 2nd edition.

BIBLIOGRAPHIC SOURCE(S)

American Optometric Association. Care of the patient with open angle glaucoma. 2nd ed. St. Louis (MO): American Optometric Association; 2002 Aug 17. 104 p. [589 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Primary open angle glaucoma
- Secondary open angle glaucoma
  - Pigmentary glaucoma
  - Pseudoexfoliation glaucoma

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Optometry

INTENDED USERS

Health Plans
Optometrists

GUIDELINE OBJECTIVE(S)

- To identify patients at risk of developing open angle glaucoma
- To accurately diagnose open angle glaucoma
- To improve the quality of care rendered to patients with open angle glaucoma
- To minimize the damaging effects of open angle glaucoma
- To preserve the gains obtained through treatment
- To inform and educate patients and other health care practitioners about the visual complications, risk factors, treatment options, and adverse reactions to treatments associated with open angle glaucoma

TARGET POPULATION

Patients with suspected or diagnosed open angle glaucoma

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Evaluation

1. Patient history
2. Ocular examination
3. Supplemental testing

Management/Treatment

1. Medical (Pharmaceutical)
    - Adrenergic antagonists: beta-blockers
    - Prostaglandin analogs
    - Alpha-2 adrenergic agonist
    - Topical carbonic anhydrase inhibitor
    - Adrenergic agonists: epinephrine compounds
    - Miotics
    - Oral carbonic anhydrase inhibitors
2. Laser therapy
3. Surgery
    - Filtering procedures
    - Cyclodestructive procedures
4. Alternative strategies
5. Patient education

MAJOR OUTCOMES CONSIDERED

- Efficacy of treatment
- Adverse effects of treatment/medications

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches using the National Library of Medicine's Medline database and the VisionNet database.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Committee)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review
Review of Published Meta-Analyses

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not applicable

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The Reference Guide for Clinicians was reviewed by the American Optometric Association (AOA) Clinical Guidelines Coordinating Committee and approved by the AOA Board of Trustees.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Initial Glaucoma Evaluation

The initial glaucoma evaluation may include the tests and procedures of a comprehensive adult eye and vision examination in addition to some procedures specific to the differential diagnosis of glaucoma. Baseline data are established for key clinical parameters that must be evaluated longitudinally in the proper management of glaucoma. Potential components of an initial glaucoma evaluation (discussed in detail in the original guideline document) include:

1. Patient history
    - Ocular and systemic risk factors and medical history
2. Visual acuity
    - Corrected and uncorrected visual acuity
3. Pupil assessment
    - Relative afferent pupillary defect
4. Biomicroscopy
    - Evaluation of anterior and posterior ocular segment
5. Applanation tonometry
    - Diurnal variability
    - Symmetry
6. Gonioscopy
    - Open or closed angle
    - Primary or secondary glaucoma
7. Assessment of optic nerve
    - Stereoscopic evaluation through a dilated pupil
    - Tomography
8. Assessment of nerve fiber layer
    - Stereoscopic evaluation through a dilated pupil
    - Evaluation with red-free illumination
    - Confocal scanning laser polarimetry, optical coherence tomography, confocal scanning laser ophthalmoscopy
9. Assessment of peripapillary area (PPA)
10. Fundus stereo photography
    - Photodocumentation of optic nerve and nerve fiber layer
11. Visual Fields
    - Standard automated perimetry
    - Frequency doubling perimetry
    - Short wavelength automated perimetry

Follow-up Glaucoma Evaluation

Individuals with one or more risk factors, who have higher probabilities of developing primary open angle glaucoma (POAG), need more frequent evaluation to rule out the presence of the earliest clinical signs of glaucoma. This evaluation should be done at least yearly in the absence of complicating factors, but perhaps more often, depending on the person's relative risk of developing glaucoma.

Follow-up evaluation of the patient with diagnosed open angle glaucoma (OAG) is similar to the procedure used to make the initial diagnosis of the disease and may include, but is not limited to, the following assessments (further discussed in the original guideline document):

- Patient history
- Visual acuity
- Blood pressure and pulse
- Biomicroscopy
- Tonometry
- Gonioscopy
- Optic nerve assessment
- Nerve fiber layer assessment
- Fundus photography
- Automated perimetry
- Supplemental testing

Available Treatment Options

Traditionally glaucoma treatment has begun with pharmacological intervention, proceeding to laser therapy and surgery, when necessary. This approach was designed to maximize the benefit of the treatment, while minimizing the risk to the patient. Recently, this method has been challenged as less effective than other sequences of therapy. Many glaucoma patients may require all three treatment options. These options should be available because glaucoma is a chronic, progressive disease with no known cure.

In the choice of a specific form of treatment or the decision to alter or provide additional therapy, the risk or benefit to the patient must be the overriding consideration. All forms of treatment for glaucoma have potential side effects or complications. The possible impact of the treatment socially, psychologically, financially, and from a convenience standpoint must be evaluated.

The following three levels of treatment are described in greater detail in the guideline document:

Medical (Pharmaceutical)

The treatment of open angle glaucoma (OAG) includes the use of orally administered or topical agents that enhance aqueous outflow or reduce aqueous production or both. Pharmacological management of OAG includes:

- Cholinergic agonists – miotics (pilocarpine – solution, gel, or membrane-bound wafer; carbachol)
- Adrenergic agonists (nonselective [epinephrine, dipivefrin]; selective [apraclonidine, brimonidine])
- Beta-adrenergic blocking agents (nonselective [carteolol, levobunolol, metipranolol, timolol] selective [betaxolol])
- Carbonic anhydrase inhibitors (systemic –oral [acetazolamide – injection or sustained release, dichlorphenamide, methazolamide], topical [dorzolamide, brinzolamide])
- Prostaglandin analogs (bimatoprost, latanoprost, travoprost, unoprostone isopropyl)
- Combination medications

Laser therapy

The second level of primary open angle glaucoma (POAG) involves the use of systemic medication or laser procedures. As an alternative to drug therapy, argon laser trabeculoplasty (ALT) is a common treatment after topical medication for POAG.

Surgery

Surgical intervention, the third level of treatment for POAG, is required in many moderate or advanced glaucoma patients, to lower the intraocular pressure (IOP) into the target range, especially in normal tension glaucoma (NTG) or eyes resistant to other forms of therapy.

Filtration surgical procedures create alternative pathways for the outflow of aqueous. Among various filtering procedures used to lower IOP are thermal sclerostomy, posterior or anterior lip sclerectomy, trephination, and trabeculectomy. Cyclodestructive procedures, which damage the ciliary body and thereby decrease aqueous production, are less commonly used, being reserved for the most advanced stages of the disease.

Patient Education

The proper management of glaucoma requires full compliance by the patient. Patient education regarding the benefits and risks of the treatment and proper use of medications is critical to ensure maximum compliance. Continual reinforcement of the seriousness of the disease and the importance of following the therapy regimen is essential.

Prognosis and Follow-Up

Once treatment for glaucoma has been initiated, follow-up examinations are required to monitor: stability of the intraocular pressure (IOP), optic nerve (ON), visual field (VF), and peripapillary area (PPA); patient compliance with the therapy; the presence of side effects associated with the treatment; and the effectiveness of patient education. Follow-up also provides an opportunity to reconfirm the diagnosis. Determining whether the disease is progressing may be clinically challenging, due to the difficulty, in some patients, of distinguishing

subtle structural or functional changes representing normal fluctuation from changes caused by progressive glaucomatous damage.

The frequency of follow-up evaluations of a glaucoma patient under active treatment depends on the level of intraocular pressure and the stability and severity of the disease. The following table summarizes the frequency and composition of evaluation and management visits for open angle glaucoma.

Frequency and Composition of Evaluation and Management Visits for Open Angle Glaucoma

Type of Patient	Frequency of Examination	Tonometry	Gonioscopy	Optic Nerve (ON) / Nerve Fiber Layer (NFL) Assessment	Stereoscopic ON, NFL, and Peripapillary Area (PPA) Documentation Confocal scanning laser imaging (CSLI)**	Per
New glaucoma patient or new glaucoma suspect	Weekly or biweekly to achieve target pressure	Multiple readings may be necessary to establish baseline	Standard classification and drawing an initial visit	Dilate; optic nerve drawing at initial visit	As part of initial glaucoma evaluation	Rep esta base
Glaucoma suspect	6 to 12 months, depending on level of risk	Multiple readings may be necessary to establish baseline	Annual	Dilate every other visit	Every 2 years; CSLI Annual*	Ann
Stable - mild stage	4 to 6 months	Every visit	Annual	Dilate every other visit	Annual	Ann
Stable - moderate stage	2 to 4 months	Every visit	Annual	Dilate every other visit	Annual	6 to mor dep prio
Stable - severe stage	1 to 3 months	Every visit	6 months	Dilate every other visit	Annual; CSLI?*	4 to mor dep prio
Unstable - IOP poorly controlled;	Weekly or biweekly until stability is	Every visit	Initial visit and each time other	Dilate at initial visit and each	Annual or each time ON or NFL changes	4 to or a to e

Type of Patient	Frequency of Examination	Tonometry	Gonioscopy	Optic Nerve (ON) / Nerve Fiber Layer (NFL) Assessment	Stereoscopic ON, NFL, and Peripapillary Area (PPA) Documentation Confocal scanning laser imaging (CSLI)**	Per
ON or VF progressing	established		clinical findings warrant a reassessment	time other clinical findings warrant reassessment		new base
Recently established stability	1 to 3 months	Every visit; re-establish baseline	Depends on severity of the glaucoma	Dilate every interim visit	Annual or each time ON or NFL changes	Dep seve the

*Confocal scanning laser imaging (CSLI) is recommended once annually in glaucoma suspect patients and those with mild to moderate disease who can respond to standard testing. CSLI may be performed up to 2 times per year for patients in whom visual fields or tonometry cannot be assessed or in patients with unstable borderline control and other glaucoma risk factors. CSLI may not be useful for monitoring stable-severe or end-stage disease.
**Threshold automated perimetry is recommended.

CLINICAL ALGORITHM(S)

An algorithm is provided for Optometric Management of the Patient with Primary Open Angle Glaucoma.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

The effectiveness of the treatment of primary open angle glaucoma (POAG) depends on the specific modality and varies significantly between studies. The majority of POAG patients with maximally tolerated medical therapy will show progression of the disease within 10 years of initial treatment. This rate of progression can be reduced if the intraocular pressure (IOP) is maintained at about 16 to 17 mm Hg. In only about one-half of cases is glaucoma adequately

controlled 5 years after argon laser trabeculoplasty (ALT), no more than one-third after 10 years. Filtration surgery in a previously unoperated eye with POAG has a high initial success rate. Progression of visual field (VF) loss following filtering surgery can be minimized when the IOP is maintained at about 15 mm Hg. Target IOPs for maintaining stability during the treatment of POAG need to be adjusted on an individual basis, depending on patient age, cumulative risk for progression of the disease, and severity of the glaucoma.

Subgroups Most Likely to Benefit

Risk Factors for the Development of Glaucoma

- Age: The prevalence of glaucoma is 4 to 10 times higher in the older age groups than in persons in their forties.
- Race: African Americans develop primary open angle glaucoma earlier, do not respond as well to treatment, require surgery at a higher rate and have a higher prevalence of blindness from glaucoma than Caucasians.
- Genetic factors: Close relatives of persons with primary open angle glaucoma have a prevalence of the disease 3 to 6 times greater than that of the general public, and first-degree relatives have a 3 to 5 times higher incidence of the disease.
- Ocular: Intraocular pressure has a strong and direct relationship with the prevalence and long-term risk for glaucoma.

POTENTIAL HARMS

Adverse Effects of Medical Treatment (Pharmaceuticals)

Pharmaceutical agents	Adverse reactions	
	Ocular	Systemic
Pilocarpine	Stinging, irritation Ciliary spasms (myopia) Miosis (vision) Pupillary block Retinal detachment	Headache, pain Sweating Vomiting/diarrhea Salivation Bradycardia Arrhythmia Dyspnea
Epinephrine[1]	Stinging, burning Mydriasis Allergic sensitivity Pigment deposits Cystoid macular edema Increased intraocular pressure (IOP)	Increased blood pressure Increased heart rate Severe headaches Anxiety
Alpha-2 agonists	Allergic sensitvity[2] Minimal mydriasis[2] Lid retraction[2]	Gastrointestinal discomfort Taste abnormalities

Pharmaceutical agents	Adverse reactions	
	Ocular	Systemic
	Conjunctival vasoconstriction[2] Stinging, burning Foreign body sensation Hyperemia Conjunctival follicles	Headache Fatigue/drowsiness Oral dryness
Topical beta-blockers	Stinging, burning Superficial punctate keratitis Allergic sensitivity Decreased corneal sensitivity Uveitis[4]	Dyspnea[3] Bronchiole constriction[3] Decreased heart rate[3] Arrhythmias[3] Decreased blood pressure Depression, confusion Gastrointestinal discomfort Impotence Sleep disturbance Serum lipoprotein alterations Masking symptoms of diabetes mellitus and hyperthyroidism
Oral carbonic anhydrase inhibitors	None	Malaise Depression, confusion Metallic taste Anorexia Diarrhea Paresthesias Kidney stones Metabolic acidosis Blood dyscrasias
Topical carbonic anhydrase inhibitors	Stinging/burning Allergic sensitivity Blurred vision Superficial punctate keratitis Corneal edema	Altered taste
Prostaglandin analogs	Blurred vision Stinging, burning Hyperemia Foreign body sensation Itching Increased iris pigmentation[5] Eyelash changes Punctate epithelial keratitis Cystoid macular edema	Headaches Upper respiratory tract symptoms

Pharmaceutical agents	Adverse reactions	
	Ocular	Systemic
	Iritis Herpes simplex keratitis	

[1] Adverse ocular reactions and contraindications are less with dipivefrin than with epinephrine
[2]Adverse ocular reactions are less common with brimonidine
[3]May be less severe with betaxolol
[4]Metipranolol
[5]Only one reported change in iris coloration with unoprostone isopropyl

Complications of Laser therapy

Possible complications of argon laser trabeculoplasty (ALT) include an increase in intraocular pressure within hours of the procedure and inflammation, which may lead to the formation of peripheral anterior synechiae.

Complications of Surgery

Short-term complications from filtering surgery can include the development of shallow anterior chambers, hypotony, choroidal detachment, uveitis, hyphema, suprachoroidal hemorrhages, and loss of a remaining small island of central vision. Long-term complications can include corneal edema, infection, leaking or failure from fibrosis of the subconjunctival bleb, cataract formation, and endophthalmitis.

CONTRAINDICATIONS

CONTRAINDICATIONS

Contraindications to Pharmaceutical Agents

	Contraindications	
	Ocular	Systemic
Pilocarpine	History of retinal detachment Severe myopia Cataracts Inflammation/infection Aphakia/pseudophakia	Asthma Ulcers Bladder dysfunction Parkinson's disease
Epinephrine	Aphakia/pseudophakia Narrow angles	Systemic hypertension Heart disease Hyperthyroidism Diabetes mellitus

Contraindications

	Ocular	Systemic
		Certain medications
Alpha-2 agonists	None	None
Topical beta-blockers	Narrow angles	Chronic obstructive pulmonary disease (COPD) Systemic hypotension Bradycardia Diabetes mellitus Myasthenia gravis Certain medications
Oral carbonic anhydrase inhibitors	None	History of kidney stones Liver disease Sulfonamide allergy Cardiac disease Addison's disease Renal disease Severe COPD
Topical carbonic anhydrase inhibitors	Corneal endothelium compromise	Sulfonamide allergy
Prostaglandin analogs	History of uveitis, cystoid macular edema, herpes simplex, keratitis, complicated cataract surgery	None

Contraindication to Laser Therapy

The use of argon laser trabeculoplasty (ALT) is contraindicated in patients with corneal edema or opacities that prevent a clear view of the anterior chamber angle, in those who have certain forms of secondary glaucoma, and in situations, where a large decrease in intraocular pressure is required.

Contraindications to Surgery

Filtering surgery is contraindicated in eyes that are already blind and in patients with severe systemic medical problems.

QUALIFYING STATEMENTS

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- Clinicians should not rely on this Clinical Guideline alone for patient care and management. Please refer to the references and other sources listed in the original guideline for a more detailed analysis and discussion of research and patient care information.
- The components of patient care described in this guideline are not intended to be all-inclusive. Professional judgment and individual patient symptoms and findings may have significant impact on the nature, extent, and course of services provided. Some components of care may be delegated.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Optometric Association. Care of the patient with open angle glaucoma. 2nd ed. St. Louis (MO): American Optometric Association; 2002 Aug 17. 104 p. [589 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1995 (revised 2002 Aug 17)

GUIDELINE DEVELOPER(S)

American Optometric Association - Professional Association

SOURCE(S) OF FUNDING

Funding was provided by the Vision Service Plan (Rancho Cordova, California) and its subsidiary Altair Eyewear (Rancho Cordova, California)

GUIDELINE COMMITTEE

American Optometric Association Consensus Panel on Care of the Patient with Open Angle Glaucoma

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previously published version: Care of the patient with open angle glaucoma. St. Louis (MO): American Optometric Association; 1995. 90 p.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American Optometric Association Web site.

Print copies: Available from the American Optometric Association, 243 N. Lindbergh Blvd., St. Louis, MO 63141-7881.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 2, 1999. The information was verified by the guideline developer as of January 31, 2000. This summary was updated by ECRI on April 16, 2004. The information was verified by the guideline developer on May 10, 2004.

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